

## CHAPTER 2

### PRELIMINARY INVESTIGATIONS

---

#### 2-1. General.

The subgrade provides a foundation for supporting the pavement structure. As a result, the required pavement thickness and the performance obtained from the pavement during its design life will depend largely upon the strength and uniformity of the subgrade. Therefore, insofar as is economically feasible, a thorough investigation of the sub-grade should be made so that the design and construction will ensure uniformity of support for the pavement structure and realization of the maximum strength potential for the particular sub-grade soil type. The importance of uniformity of soil and moisture conditions under the pavement cannot be overemphasized with respect to frost action.

#### 2-2. Investigations of Site.

Characteristics of subgrade soils and peculiar features of the site must be known to predict pavement performance. Investigations should determine the general suitability of the subgrade soils based on classification of the soil, moisture-density relation, degree to which the soil can be compacted, expansion characteristics, susceptibility to pumping, and susceptibility to detrimental frost action. Such factors as groundwater, surface infiltration, soil capillarity, topography, rainfall, and drainage conditions also will affect the future support rendered by the subgrade by increasing its moisture content and thereby reducing its strength. Past performance of existing pavements over a minimum of 5 years on similar local subgrades should be used to confirm the proposed design criteria. All soils should be classified according to the Unified Soil Classification Systems (USCS) in ASTM D 2487.

#### 2-3. Soil Conditions.

*a. General survey of subgrade conditions.* Sources of data should include the landforms, soil

conditions in ditches, and cuts and tests of representative soils in the site. The survey should be augmented with existing soil and geological maps. Both natural and subsurface drainage of the sub-grade must be considered.

*b. Preliminary subsurface explorations.* Preliminary subsurface explorations should be made at intervals selected to test each type of soil and topography identified in the general survey. Additional subsurface explorations should be made in those areas where the preliminary investigation indicates unusual or potentially troublesome subgrade conditions. In determining subgrade conditions, borings will be carried to the depth of frost penetration, but no less than 6 feet below the finished grade. In the design of some high fills, it may be necessary to consider settlement caused by the weight of the fill. The depth requirements stated above will usually result in the subsurface explorations reaching below the depth of maximum frost penetration. If this is not the case, they should be extended to the maximum depth of frost penetration below the design grade as determined from chapter 10.

*c. Soil.* Soil samples from the preliminary borings should be classified and the data used to prepare soil profiles and to select representative soils for further testing. Measurements should include moisture contents which indicate soft layers in the soil.

#### 2-4. Borrow Areas.

Where material is to be borrowed from adjacent areas, subsurface explorations should be made in these areas and carried 2 to 4 feet below the anticipated depth of borrow. Samples from the explorations should be classified and tested for moisture content and compactions characteristics.